ENVIRONMENTAL EFFECTS ON DENTAL STUDENT ATTITUDES

By

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INTRODUCTION

Currently dental educators are defining the learning environment as more than lecture halls, laboratories, and clinics. Greater emphasis is being placed on the psychological aspects of learning, and teaching is being structured to meet the needs of students as individuals rather than merely to cover a specific unit of subject matter. In this context, it seems appropriate that attention be paid to ways of understanding the attitudes of the students toward dental education. These attitudes may affect not only their intellectual achievement but also, and perhaps more significantly, their outlook toward dentistry as a profession.

Concerning the role of the dental educator, in this regard, Schour[1] wrote in 1965:

> Good teaching, when it has occurred, has been a happy circumstance rather than a dominant characteristic of dental education. For too long, competence in subject matter was the only criterion for selection of a dental teacher. It is now recognized that a teacher must not only know his subject, but also know how to teach. He must understand the student and himself.

Cooper[2] observed in the same year that:

> Reduced to its essentials, effective teaching would seem to involve three elements: (1) knowledge of subject matter, (2) an understanding of the students, and (3) skill in bringing these two factors together. If a professor is deficient in any of these three attributes, he may still be a great scholar or a great humanitarian but he can hardly be a great teacher.

Today, of course, considerable emphasis is being given to educational methodology, curriculum analysis and revision, faculty teaching conferences, and courses in education as part of the dental teacher's in-service training and of the graduate education programs in dentistry.

However, little has been done by way of investigating the attitudes or values of dental students and questions as to whether and in what ways these attitudes are molded by the environment of the dental school. Admittedly, any attempt to measure attitudes involves problems of validity and reliability; and administering the measuring instrument and controlling the many variables become difficult. Perhaps that is why such studies are rare. This is unfortunate because as Anastasi[3] has pointed out:

> The strength and direction of a student's interests and values represent an important aspect of his personality. These characteristics materially affect his educational and vocational adjustment.

Although he was primarily discussing undergraduate liberal arts education, in 1962 Sanford[4] clearly pointed out the shortcomings of much research concerning the attitudes of students. He stated:

> Very little is known of what effects, if any, the experience of going to college has on students and less of what particular features of the college environment determine such effects as have been observed. The empirical studies that have been done in the past have been mainly of the ad hoc variety and so local in their orientation as to make generalization impossible.

When the dental student has advanced beyond the basic science phase of the traditional dental school curriculum and is exposed not only to clinical dentistry but also a closer association with successful practicing dentists as instructors, he seems to place greater emphasis on certain values or motives, often economic in nature.[11,12,30] On the other hand, the social awareness which is aroused by his contact with patients in the dental school clinics provides some balance with

respect to this exposure to a more conservative philosophy toward social programs in dentistry.

In the dental literature only a limited number of studies have dealt with the general hypothesis that the attitudes of dental students markedly change as they progress through school, and the findings have not been consistent.

Some authors[10,27,30] have reported significant changes in various attitudes of dental students during dental school. Other authors[23,29] have found no significant changes during the dental school experience. Even when more credibility is given to longitudinal studies[10,29] than to cross-sectional studies[23,27,30] the results are so varied that no definite statements can be made from these investigations. Furthermore, none have explained why changes might occur or whether they are limited to specific groups of students, such as high achievers or low achievers.

Due to these inconsistencies, the purpose of this thesis is to document significant changes in certain values of specific groups of dental students. By means of a questionnaire, an attempt will be made to investigate some factors within the dental school environment which may contribute to this change. Ultimately, the goal is to add to the limited store of information available to dental school administrators and teachers who seek a better understanding of the nature and the needs of their students.

The literature suggests a high degree of economic motivation for dental students[8] and also a change in values during the third year of

dental school.[30] The author maintains that dental students will come to place a greater emphasis on economic motives during the clinical phase of their education which places them in daily contact with dental faculty members who are successful dentists. Furthermore, this change will be more apparent among students receiving positive from this environment in the form of good grades. Therefore the hypotheses of this study were these:

1. Significantly greater emphasis on economic motives could be demonstrated during the time from the beginning of the third year of dental school to the end of the year.
2. No significant changes would occur in any of the other values measured during this period.
3. Significantly greater emphasis on economic motives could be demonstrated for students receiving high grades.
4. Significant environmental factors within the dental school could be isolated which were responsible for the attitude change. A questionnaire was devised on the basis of interviews with fourth-year students to determine environmental factors related to this change. Because there are no reported studies on which to base this aspect of the investigation, it must be considered exploratory in nature.

To obtain the information, a class of third-year students at the Indiana University School of Dentistry were given the Allport-Vernon-Lindzey Study of Values immediately prior to the beginning of their clinical experience and again after eight months. On the latter occasion, replies to the questionnaire provided supplemental data. Additional information was obtained from groups of freshman and senior dental students, as will be outlined in the Methods and Materials section.

REVIEW OF THE LITERATURE

This review will be presented under three headings: (1) The Dental Student, (2) The Dental School, and (3) Attitude Testing of Professional Students.

The Dental Student

With data compiled from students at 16 dental schools, O'Shea, Lefcowitz, and Gray[6] in 1966 described the socio-economic status of the dental student:

> The social composition of the dental student mirrors the position held by dentistry in American society -- a well-paid, high-status, professional orientation. Ninety-eight per cent of students are native-born Americans. About 90 per cent of their mothers and fathers are also native-born. Ninety-seven per cent are white males. Seventy per cent describe the status group of their parents as "middle class" or "upper class". Over 40 per cent report their parents' income as having been over $7,500 when the students were in high school. [The median family income in 1955 was reported to be about $4,600][7] Forty-two per cent of their fathers had education beyond high school; and 53 per cent were in professional, managerial, or business occupations.

In that study, two-thirds of the students were married, most worked during the school year, and almost half needed the money they earned along with the income from working wives to finance their education. Nearly all expected to be in debt at graduation. In this description, dental students apparently do not differ markedly from other groups of students seeking graduate or professional degrees.

In one of the earliest investigations of the dental student's psychological profile, Heist[8] in 1960 studied 613 students from nine dental schools. His sample represented 20 per cent of the total number of first year dental students for the year 1956, and his evalua-

tions were based on the following psychological inventories: The Edwards Personal Preference Schedule (EPPS), the Allport-Vernon-Lindzey Study of Values (SOV), and the Strong Vocational Interest Blank for Men (SVIB). From the EPPS data, Heist found his sample of dental students to be other-directed, concerned about what others think, generally conforming to the conventional and traditional, and seemingly having little need to assume responsibility for directing others. The typical student preferred to accept the status quo rather than to seek change, desired a high degree of organization and neatness within his environment, and was not easily diverted from an established goal.

The scores of this same group on the Study of Values (SOV) reflected the importance that the students attached to a theoretical approach to learning. Their quest for knowledge, however, appeared to be based on its pragmatic value rather than on an intrinsic need to understand. This finding seems consistent with the results of the EPPS.

Using the same inventories, Heist compared dental student scores to those of medical and engineering students. Medical students had higher theoretical values and were less pragmatic. While the dental students' second highest score was in the area of economic values, indicating a high degree of importance for material acquisitions, this value was ranked last by medical students. When compared to engineering students, the dental students had almost identical profiles for the six values. In a summary of his findings, Heist noted:

> The ulterior motivation of upward mobility and the anticipated material advantages at a higher economic level are not likely to lead to experimentation and risk-taking in the realm of the unknown. The achievement motivation, certainly present in these men, together with the need to persist and endure the transition from lower economic strata to professional status is utilitarian and practical. The basic motivation for the majority is not centered in a need for independence, in social service, nor in the quest for new knowledge --- and not in mere financial remuneration. A most general conclusion to be read from data from all three inventories is one of advancement....advancement in a socially upward direction to a perceived better way of life.

An additional finding of this study was that differences existed among the nine schools studied and it was inferred that these differences reflected the individual school's selection of students based on an appraisal of their motivation and attitudes.

In 1963 Kirk, Cummings, and Hackett[9] conducted a study to test the hypothesis that professional integrity might be predicted prior to admission to dental school. With an extensive review of the literature and a sound experimental method, these investigators gave the California Psychological Inventory (CPI) to 228 dental students, 59 alumni, and 56 faculty members, and the Strong Vocational Interest Blank (SVIB) to 180 dental students. Comparisons were made of the scores on the SVIB and the CPI and the faculty ratings of professional integrity. Although no correlation between interests and professional integrity could be demonstrated, the following description of the average dental student was assembled from the data:

> The average entering dental student tends to be conventional, conforming, conservative, to prefer the status quo, to be concerned about what others think of him, deferential to authority, unconsciously aggressive, per-

> sistent, conscientious, methodical, somewhat rigid and inflexible, neat and orderly, non-intraceptive, to minimize his worries and complaints, to be dependent, pragmatic, utilitarian, non-esthetic, and more interested in the applied than the theoretical aspects of knowledge.

In 1965 Rosenberg[10] conducted a longitudinal study involving dental students and a psychological measurement. He administered the California Psychological Inventory (CPI) to 47 prospective dental students, all males, before they entered dental school. These students were followed during their four years of dental school and tested again just before graduation. The purpose of this study was to assess any changes over the four years. When re-tested, according to Rosenberg, the students:

> ...tended to be less self-reliant and independent, to have less leadership potential and initiative, to be less ambitious, active, forceful, insightful, resourceful, and versatile, as being less ascendent and self-seeking, and as being more stereotyped in their thinking.

Rosenberg also reported that the student had become "less spontaneous, and less dependable." The only positive change noted was that the dental students had become "more interested in the inner motives, needs, and experiences of others." He did not comment as to whether these changes might have been a function of the environment, of maturation, or a combination of both, or of other factors. These findings suggest an interaction between the dental student's pre-admission personality characteristics and the dental school environment. This inference seems to have some support from Rosenberg's comparison of medical and dental students. At the time of admission

to their respective schools, both groups were strikingly similar in their measured personality profiles. After four years, many measurable differences could be demonstrated. It seems possible, therefore, that environmental forces might have had an effect on the differences of personalities of both groups.

Linn[11] reported in 1968 on a study to determine the "validity" of dental students' statements in regard to their professional objectives, particularly the objective of service to others as opposed to economic gain. Data were gathered from questionnaires returned by 2,183 third and fourth year dental students from 15 schools. The students' emphasis on the various objectives was rated by 775 faculty members from the same schools. Linn found that the students ranked "service to others" as their most important professional objective and "economic gain" as least important. In the faculty rating this placement of motives was considered of "dubious validity." Linn also cited a study by Quarantelli[12] in which students at two midwestern dental schools were more inclined to mention financial considerations than service to others as their main reason for selecting dentistry as a career. Moreover, in Linn's own study, students rated their classmates as being more concerned with economic gain than service to society.

In summary, the dental literature is in fairly consistent agreement that the dental profession appeals to a rather constricted type of person, who is compulsive, materialistic, culturally restricted and traditional. Economic gain seems to be more important to him

than service to society. Unfortunately, there is a suggestion that these characteristics may actually receive reinforcement during the course of dental education.

The Dental School

Hollinshead[13] sent questionnaires to all students who were attending dental school in 1959, and 11,469 were completed and returned. In one section of the questionnaire, the students were asked to comment on the quality of their education. The responses were reported in the Survey of Dentistry - 1962:

> Frequently the comments were critical and even caustic. None of the schools escaped without criticism from its students. The only variation seemed to be in the degree of fault found and the amount of bitterness evidenced.

The problems mentioned by the students included poor student-faculty relationships, excessive pressures, and the fears generated by these conditions. The students specifically mentioned, "overlapping and repetition of course content, poor lectures and examinations, regimentation, lack of an effective student council, lack of enough full-time teachers, and innumerable related criticisms."

While the report did mention the hostility underlying these comments, the editors minimized the importance of this observation.

In 1962 More[14] reported on a most ambitious longitudinal study of the dental student. Four years earlier, he had sent a questionnaire to all freshman dental students in the United States, Canada, and Puerto Rico. Ninety-nine per cent of the questionnaires were

returned providing data on 3,578 dental students. Then in 1962 a similar questionnaire was sent to the same group of students. Many students reported that their "professional demeanor" was shaped primarily through their association with the faculty. The students expressed admiration for those educators with a concern for the scientific advancement of dentistry and those who treated their students with respect and seriousness. However, in all but one of the 53 schools surveyed, More found "repeated mention of improper and degrading behavior of the dental school faculty, especially with reference to instructors on the clinic floor."

Similar poor student-faculty relationships were reported in the previously cited study in 1966 by O'Shea, Lefcowitz, and Gray[6] of students at 16 dental schools in 1960-61. About 50 per cent of the students felt they were known by name to fewer than 10 faculty members. Furthermore, the students reported that the faculty provided little support for their self-image as dentists.

Meyer[15] in 1961 interviewed 12 faculty members concerning factors which can influence student motivation. He found that a majority of the faculty members in this limited sample considered student motivation to be primarily intrinsic to the students rather than something which could be improved or retarded through their efforts as faculty members. This interpretation of the nature of motivational forces seems to be consistent with the lack of empathy and understanding for students which has been reported in the literature.

In 1971 Walker[16] studied the evaluation of the dental school faculty by dental students and made the following observations:

> Apparently dental students are much more aware or cognizant about what they like about dental professors than what they dislike. Disorganized and poorly prepared lectures seem to be the most universally identified trait to which students respond in a negative way.
>
> The senior class reacted the most unfavorably to destructive criticism. Examples given were criticizing without giving advice on what to do to improve and especially criticism in front of patients. It would appear that individuals responsible for clinical instruction should re-examine their method of feedback to students in regard to their clinical performance. A less destructive manner of clinical criticism would seem to be proper for better student-faculty relationships.

On the basis of the studies reviewed in this section, it is apparent that the dental student feels hostile and that a great deal of his hostility is directed toward the dental school and the faculty. It further appears that the faculty plays a major role as a model for the dental student, but that the actions of the faculty are often rejected by the student.

In summary, these studies suggest that the goal of producing a socially motivated professional will not easily be accomplished, particularly in light of the initial attitude profile evidenced by incoming first year dental students discussed previously. Furthermore, the lack of appropriate models and reinforcement within the dental school hinders behavior modification in a positive direction.

Attitude Testing of Professional Students

There is much interest among dental educators in the area of student attitudes and the term "attitude" appears frequently in the studies reviewed. What is meant by the word?

In an editorial, Durocher[17] called attention to the "professional attitudes" of the dental student:

> In the summers of 1959 and 1960, institutes for dental teachers were conducted at a midwestern university. Both ...identified four cardinal characteristics of the professional man: skill, knowledge, judgment, (in terms of skill and knowledge) and attitude. These groups, composed of different individuals, came to the conclusion that dental graduates as a whole had achieved skill, knowledge, and judgment but that their attitude left much to be desired. Upon close examination, it was evident that this (term) attitude referred to the student's sense of values in regard to their fellow man and their profession. ...as dental knowledge expands, as the standard of living continues to rise, as the populace becomes better educated and more sophisticated, this changing society will undoubtedly expect a different role of the dentist. And for years to come, this role may be in a very fluid state, so that many criteria for judging the practitioner will be modified. Since attitude is at the heart of human behavior, it will remain as an important criterion for evaluating the worth of the professional man.

Fisher[18] in 1960 expressed his thoughts on "attitudes" when he noted:

> ...most students and practitioners who rank high in esteem of their colleagues have an elusive quality called exceptional professional attitude. What is implied, of course, is a lofty conception and prosecution of professional affairs.

In 1965 Schour,[1] from another point of view, pointed out:

> The 1962 Report of the World Health Organization Expert Committee on Dental Health...established broad principles and guidelines to assist dental educators throughout the world... In setting up the 10 specific objectives of dental education in terms of the knowledge, skills, and attitudes that are to be acquired by the student, it is significant that five of these were directly related to attitudinal values of professional and social conduct. It is a sobering thought that the current dental curriculum throughout the world provides less than five per cent of its hours to the development and consideration of attitudes to which the W.H.O. assigns such great significance.

These articles make many references to "attitude" but exact interpretation is a bit obscure because the term is not precisely defined. In reviewing the literature which deals with attitudinal studies, one must attend closely to variations in the operational definitions of "attitude."

Campbell[19] in 1963 indicated that attitude is one of a large group of social science concepts which refer to acquired behavioral dispositions. Related terms include adjustment, interest, motive, opinion, personality trait, prejudgment, response probability, set, and value.

Attitude studies with precise operational definitions are more numerous in the medical literature than in the dental literature. Although it is not being suggested that the results of studies involving medical students can be applied here in any meaningful way, a few such studies will be reviewed for their tangential interest.

In 1955 Eron[20] studied the effects of medical education on certain attitudes of medical students. He concluded that cynicism, humanitarianism, and anxiety fluctuate in their interrelationships ac-

cording to the student's stage of medical education. He reported:

> Medical students, as they progress through medical school, increase in the verbal expression of cynical attitudes and conscious symptoms of anxiety and decrease in the expression of humanitarian feeling.

Similar evidence of a change in personality was reported by Hutchins[21] in 1962. In a cross-sectional study of medical students evaluated with the Allport-Vernon-Lindzey Study of Values, he concluded that first year medical students had significantly higher scores on the theoretical values and lower scores on the economic and aesthetic values than did senior medical students just prior to graduation. In the same study, findings with the Edwards Personality Preference Schedule (EPPS) also indicated that there were personality differences between the first and fourth years of medical school.

Rosinski[22] in 1963 found positive attitudinal changes toward medicine during medical school, but negative changes toward research and continuing education.

Attention will now be drawn to a review of attitudinal studies involving only dental students. Many of the studies previously reviewed under the heading, "The Dental Student," not only provided a sociological picture of the dental student but also dealt with various aspects of psychological testing and attitudinal investigation. These included the studies of Heist,[8] Kirk, Cummings, and Hackett,[9] Rosenberg,[10] O'Shea, Lefcowitz, and Gray,[6] and Linn.[11] Other authors have studied dental student attitudes as related to various aspects of their dental education.

Crowder,[23] Moosbruker and Giddon,[24] and Stiff and Phipps[25] investigated the attitudes of dental students toward social responsibility. Student attitudes toward treatment of chronically ill, aged, and disabled persons were measured before and after a program of clinical experience in the delivery of this care. In a summary of these studies, Crowder noted:

> There seems to be significant and consistent evidence that dental students are not highly motivated by the humanitarian aspects of their profession. If the dental health of the community is to improve, some method must be found, either to select a different type of student or to instill students with an attitude for social responsibility. While certainly not conclusive, these studies seem to indicate that conventional educational approaches toward attitudinal change have not been successful and may even produce a negative effect. The possibility that negative attitudes toward disadvantaged individuals may adversely affect the student's performance is also indicated.

In 1962 More[14] cited a study which reported differences in the dental student's self-perception as he approached graduation, with the greatest changes occurring during the third year of dental school.

In his address at the thirty-sixth Annual Meeting of the American Association of Dental Schools, Fisher[18] discussed the development of dental student attitudes. He said:

> It is very likely that the single most influential factor in shaping professional attitude is the clinical experience of the undergraduate (dental school) curriculum. Irrespective of what has been taught previously, it is in the clinic that students begin to arrive at more mature judgments of the practical worth and ideals which, up to then, were accepted largely at face value. These judgments are not always original, but partake of attitudes shown by the faculty in setting policy and atmosphere and intellectual tenor of clinical practice.

Kalis, Tocchini, and Thomassen[26] reported in 1962 a study which involved 910 freshman dental students from 1957 to 1960. The authors attempted to determine if a relationship existed between failure or drop-out from dental school and any measurable personality characteristics. The Minnesota Multiphasic Personality Inventory (MMPI) and the California Psychological Inventory (CPI) were used to measure the personality characteristics. There were no measurable test differences between students rated high or low by the faculty, students remaining in school or dropping out, students high or low in class standing, or applicants accepted or rejected. The findings indicated that these particular tests would not be of value in the selection of candidates for dental school.

Dworkin[27] in 1967 made a cross-sectional comparison of the personality needs of 43 freshmen and 18 senior dental students in an effort to record any changes attributed to the educational program. With the limitations of a small sample and a cross-sectional study, he reported the existence of significant differences in two of the 20 needs which were measured.

In an attempt to correlate American Dental Association Dental Aptitude Test (D.A.T.) scores, achievement in dental school and certain personality factors, Fogels and Janke[28] in 1962 ranked 96 senior dental students and divided them into quarters based on their junior year grade point average. Mean scores on the academic and motor parts of their D.A.T. examinations were computed. About 20 per cent of the students in each quarter were below or above the norm for

their group. More simply stated, some students were achieving higher scores than predicted and other scores were lower than predicted. In the same study, the Semantic Differential (S.D.), a scale for measuring the relative importance that a given set of concepts has for an individual, was given to the senior students. The S.D. responses were suggestive of anxious individuals.

A later longitudinal study of Fogels, Janke, and Shiere[29] in 1970 considered the question raised by the preceding study. Is the senior year of dental school an anxiety-producing period? The same students were tested annually from the first through the fourth years. The hypothesis was that freshmen students might be more flexible but that after four years of dental school, there would be measurable changes. The hypothesis was not supported by this study. Indeed, the freshman and senior years were remarkably similar.

Contrary to the findings of Fogels, Janke, and Shiere,[29] Hutton[30] reported the existence of distinct class differences. In a cross-sectional study of 644 students from 46 dental schools, he used a Semantic Differential which produced 48 factor scores for each subject. He reported:

> Based upon the discriminant analyses the four classes and the recent graduates were found to be distinguishable in terms of their responses. The greatest portion of differences appeared between the sophomore and junior years, which is roughly, the separation point between the preclinical and clinical phases of the dental curriculum.

In addition, the results of Hutton's study indicated that upperclass dental students view dentistry and dental school progressively

less favorably than underclassmen. This finding also gives some support to the previously cited report of More[14] in 1962.

In summary, there are studies[10,27,30] which report definite personality changes while the person is attending a dental school and other studies[23,29] which report no changes. The evidence is not strong enough to defend either point of view.

Three studies reported using the Allport-Vernon-Lindzey Study of Values on dental students. In one phase of a multipurpose study, Flesch[31] in 1959 applied the Study of Values to 121 male dental students from the University of Pennsylvania. She reported that the profile of dental students was closest to that of engineering students and that their highest scores were, in rank order, theoretical, economic, and political values. Their lowest scores were, in rank order, aesthetic, social, and religious values.

Heist[8] in 1960 reported a study previously described in the section on "The Dental Student" in which he used the Study of Values. Although he did not report the actual scores obtained with the Study of Values he did show this rank order of the various values: (1) Theoretical, (2) Religious, (3) Economic, (4) Political, (5) Aesthetic, and (6) Social.

In 1962 Manhold, Shatin, and Manhold[32] used various psychological tests to compare medical and dental students. Compared to the previous studies by Flesch[31] and Heist,[8] Manhold, Shatin and Manhold[32] found in two different classes of freshman dental students that the highest scores were in theoretical, political, and religious values,

and the lowest scores in economic, aesthetic, and social values. In each case, theoretical values were scored highest and social values lowest twice and second lowest once.

METHODS AND MATERIALS

The methods and materials section will be presented in three parts: (1) Methods, (2) Sample, and (3) Materials.

Methods

The methods used in this investigation consisted essentially of two phases: (1) Administration of the Allport-Vernon-Lindzey Study of Values to first- and third-year dental students and (2) Development and administration of a questionnaire which was designed to identify aspects of the dental school environment which might influence the attitudes of dental students.

By means of the Study of Values (SOV), an attitude profile of six topic areas for first-year dental students during their first week of dental school was determined. This phase has been termed the initial profile. By means of the same instrument (SOV), a profile for each quarter and the entire sample of third-year dental students on the first day of their third year of dental school was determined. This phase has been termed the pre-test. Finally, using the same instrument (SOV), a profile for each quarter and the entire sample of third-year dental students after more than eight months of clinical exposure was determined. This phase has been termed the post-test. The test period ran from May, 1971 to January, 1972.

At the time of administration of the post-test, a questionnaire was distributed to and completed by members of the third-year class of dental students. The questionnaire consisted of 17 items to which responses were made on a five-point or Likert Scale and four items to which open-end responses were made.

The Sample

The sample consisted of two groups of dental students. The first group consisted of 106 male freshman students (93 per cent of the male members of the class) who were tested during their first week of dental school to obtain an initial profile.

The second group consisted of 54 male third-year dental students who took both a pre-test and a post-test (54 per cent of the male members of the class). The pre-test was given in May, 1971 after the last examination of their second year courses and was completed in a usable form by 80 male students. The post-test was given in January, 1972 shortly after the students had received their grades for the fall semester and had been participating in clinical activities for more than eight months and was completed in a usable form by 65 male students.

The third year sample was ranked according to cumulative grade point average and divided into quarters, the first quarter including those with the highest cumulative grade point averages. It is interesting that when the sample group of 54 students was divided into quarters, the divisions corresponded closely to a quarter division of the entire class of 106.

Materials

The instruments used in this investigation were: (1) the Allport-Vernon-Lindzey Study of Values and (2) a specially constructed questionnaire designed to evaluate various aspects of the dental

school environment in terms of the student's responses to items regarding these aspects.

One objective of this study was to document, quantitatively, changes in attitudes. Therefore, an instrument designed to measure attitudes was of primary importance. In addition, because of the suspicion that attitude changes would be especially evident in the areas of social and economic values, an instrument was needed which not only would provide a quantitative measurement, but would also concern itself with social and economic attitudes, motives or values.

Under the heading of "Tests and Reviews: Character - Non-projective," Buros[33] lists many instruments for various psychological measurements. Included is the Allport-Vernon-Lindzey Study of Values. According to Hundleby:[33]

> The Study of Values has been for many years a test of interest to those concerned with the quantitative assessment of values and interests. The original, 1931, version of the test contained measures of six values based on Spranger's formulations: theoretical, economic, aesthetic, social, political, and religious.

On the basis that it measured the desired attitudes and measured them in a quantitative manner, the Study of Values was selected as the primary instrument for this study.

The Study of Values is described as follows in the Manual provided with each set of tests:

> The Study of Values aims to measure the relative prominence of six basic interests or motives in personality: the theoretical, economic, aesthetic, social, political, and religious. The classification is based directly upon Eduard Spranger's Types of Men, which defends the view

that the personalities of men are best known through a study of their values or evaluative attitudes. The scale is designed primarily for use with college students, or with adults who have had some college (or equivalent) education.

The test consists of a number of questions, based upon a variety of familiar situations to which two alternative answers in Part I and four alternative answers in Part II are provided. In all there are 120 answers, 20 of which refer to each of the six values. The subject records his preferences numerically by the side of each alternative answer. His scores on each page are then added and the totals transcribed onto the score sheet. The page totals belonging to each of the six values are then summed. After applying certain simple corrections, these six total scores are plotted on a profile, so that the subject may see his standing on all the values simultaneously.

1. The Theoretical - The dominant interest in the theoretical man is the discovery of truth. In pursuit of this goal he takes a cognitive attitude, looking for identities and differences; he divests himself of judgments regarding beauty or utility of objects, and seeks only to observe and reason. Since the interests of the theoretical man are empirical, critical, and rational, he is necessarily an intellectualist -- frequently a scientist or philosopher. His chief aim is to order and systematize his knowledge.

2. The Economic - The economic man is characteristically interested in what is useful. Based originally upon satisfaction of bodily needs (self-preservation), the interest in utilities develops to embrace the political affairs of the business world -- the production, marketing, and consumption of goods, the elaboration of credit, and the accumulation of tangible wealth. This type is thoroughly "practical" and conforms well to the prevailing stereotype of the average American businessman. In his relations with people, he is more likely to be interested in surpassing them in wealth than in dominating them (political) or serving them (social).

3. The Aesthetic - This man sees his highest value in form and harmony. Each single experience is judged

from the standpoint of grace, symmetry, or fitness. The aesthetic attitude is in a sense diametrically opposed to the theoretical; the former is concerned with diversity, the latter with the identities of experience. In the economic sphere, the aesthete sees the process of manufacturing, advertising, and trade as a wholesale destruction of the values most important to him. In social affairs, he may be said to be interested in persons, but not in the welfare of persons; he tends toward individualism and self-sufficiency.

4. The Social - The highest value of this type is love of people. In the Study of Values, it is the altruistic or philanthropic aspect of love that is measured. The social man prizes other persons as ends, and is therefore himself kind, sympathetic, and unselfish. He is likely to find the theoretical, economic and aesthetic attitudes as cold and unhuman.

5. The Political - The political man is interested primarily in power. Whatever his vocation, he betrays himself as a Machtmensch. Since competition and struggle play a large part in all life, many philosophers have seen power as the most universal and fundamental of motives. There are, however, certain personalities in whom the desire for direct expression is uppermost, who wish above all else for personal power, influence, and renown.

6. The Religious - The highest value of the religious man may be called unity. He is a mystic type and seeks to comprehend the cosmos as a whole, to relate himself to its embracing totality. Spranger defines the religious man as one "whose mental structure is permanently directed toward the creation of the highest and absoluting satisfying value experience." In many individuals, the negation and affirmation of life alternate to yield the greatest satisfaction.

Mixtures - Spranger does not imply that a given man belongs exclusively to one or another of these types of values. His depictions are entirely in terms of "ideal types," a conception fully explained in his Types of Men.

A major limitation of psychological measurement centers about the validity and reliability of the instrument. The authors of the test state that "perhaps the most direct and convincing evidence for the validity of the scale comes from examining the scores of groups whose characteristics are known." For example, students of theology or clergymen would be expected to score high in religious values and this, in fact, is the case. Regarding the reliability of the Study of Values, the Manual states:

> The following reliabilities obtained by various methods seem satisfactory - especially in view of the fact that each value is measured by only 20 questions. All reliability studies reported below are for the 1951 revision of the Study of Values.
>
> Internal Consistency (or homogeneity) - This measure of the scale is determined by two methods.
>
> A. Split-half Reliability. The items measuring each value were divided into two sub-scales. (The sub-scales were composed so that there would be approximately the same number of pairings between the value under study and all remaining values.) For a sample group the product-moment correlations (Spearman-Brown) are as follows:

(N = 100)

Theoretical	.84
Economic	.93
Aesthetic	.89
Social	.90
Political	.87
Religious	.95

> The mean reliability coefficient, using a z transformation, is .90.
>
> B. Item Analysis. Successive revisions of the test have shown that each theoretical item is positively associated with the total score derived from all the theoretical items and that the items for each of the other values likewise hang together

consistently. The final item analysis - carried out on a group of 780 subjects of both sexes from six different colleges - shows a positive correlation for each item with the total score for its value, significant at the .01 level of confidence.

Repeat Reliability (stability) - This measure has been determined for two populations, one after an interval of one month, the other after an interval of two months.

	One Month 1951 (N=34)	Two Months 1957 (N=53)
Theoretical	.87	.85
Economic	.92	.84
Aesthetic	.90	.87
Social	.77	.88
Political	.90	.88
Religious	.91	.93

The mean repeat reliability coefficient, using the z transformation, was .89 for the one month study, and .88 for the two month study.

Radcliffe in Buros[33] provides additional documentation of acceptable reliabilities, both split-half and re-test, for the Study of Values.

Another objective of this study was to determine what factors, if any, in the dental school environment had an effect upon the student and in particular, his attitudes. A questionnaire was designed which utilized a five-point or Likert Scale of response measurement. The questionnaire was designed and modified in accordance with the following five steps.

By means of an open-ended interview, 10 members of the senior class were asked to respond ad lib to the questions:

> Do you feel any of your attitudes changed during your third year of dental school? If so, can you identify some of the factors which might have contributed to this change?

Responses were classified in eight categories: student-faculty relationships, quality of course content, quality of teaching, quality of examinations, methods of grading, clinical experiences, frustrations, and experiences not associated with the dental school. In addition, the frequency of mention was noted.

With the most frequently mentioned responses serving as a guide, a preliminary questionnaire was constructed and administered to five randomly selected members of the senior class. Another opportunity for open-ended responses was provided. Upon completion of the questionnaire, the students were asked to comment on question design, wording, clearness of purpose, and suggestions for improvement.

From the comments, a revised questionnaire was made and given to a different group of five senior students, again randomly selected. Once again, upon completion of the questionnaire, the students were asked to comment on the questions. Many felt that the questionnaire was quite clear but that the time required for its completion was too long.

The questionnaire was shortened by elimination of repetitous items and shown to one member of the third-year class. The student stated that he felt that the purpose was clear and that good participation could be anticipated.

The questionnaire was given to the entire class of third-year dental students during a scheduled lecture session immediately before they were given the Study of Values post-test. Responses were made directly on IBM scoresheets to facilitate scoring. In addition, open-ended comments to various questions were requested and space for such was provided on each questionnaire.

RESULTS

The following statements summarize the findings from the Study of Values as administered to dental students at Indiana University.

1. No significant differences were observed in the paired values from pre-test to post-test for the third-year sample.
2. No significant differences were observed in the paired values from pre-test to post-test for any of the four quarters of the third-year sample.
3. No significant differences were observed when each value alone was subjected to an analysis of variance for each of the four quarters of the third-year sample.
4. While the theoretical and economic values had the highest scores for each quarter and the entire third-year sample, they were not significantly different from the other four values.
5. While the religious and social values had the lowest scores for each quarter and the entire third-year sample, they were not significantly different from the other four values.
6. A significant difference at the .05 level of confidence was observed in a cross-sectional comparison of the initial profile mean score and the pre-test mean score for the religious value.

In Tables I and II data for the initial profile, the pre-test, and the post-test are shown and compared for significant differences.

In Tables III and IV data representing the pre-test and post-test for each quarter and the entire sample are shown.

The data were subjected to an analysis of variance, the Neuman Keul test, and a t-test of paired observations. These analyses are found in Appendix A.

Data reflecting the questionnaire responses are shown in Appendix B.

TABLES

TABLE I

Study of Values Mean Scores

	$Mean_1$	$Mean_2$	$Mean_3$
Theoretical	44.18	44.83	44.06
Economic	41.80	44.06	43.70
Aesthetic	37.64	40.07	39.13
Social	38.24	36.61	38.26
Political	41.64	42.70	41.65
Religious	36.06	31.76	33.20

$Mean_1$ = Initial Profile (first-year dental students)

$Mean_2$ = Pre-test (third-year dental students)

$Mean_3$ = Post-test (third-year dental students)

TABLE II

Comparison Of Study Of Values Mean Scores

	1 vs 2	1 vs 3	2 vs 3
Theoretical	n.s.	n.s.	n.s.
Economic	n.s.	n.s.	n.s.
Aesthetic	n.s.	n.s.	n.s.
Social	n.s.	n.s.	n.s.
Political	n.s.	n.s.	n.s.
Religious	2.77*	n.s.	n.s.

1 = Initial Profile mean scores

2 = Pre-test mean scores

3 = Post-test mean scores

*Significant at .05 level of confidence.

TABLE III

Study Of Values Pre-Test Mean Scores By Quartiles

	$Mean_1$	$Mean_2$	$Mean_3$	$Mean_4$
Theoretical	47.64	44.07	44.62	42.85
Economic	43.86	46.57	44.38	41.23
Aesthetic	39.50	38.64	42.31	40.00
Social	36.71	35.43	34.69	39.69
Political	42.64	43.86	41.92	42.30
Religious	29.64	31.14	32.07	34.38

$Mean_1$ = Upper 25 per cent of sample according to cum. GPA.

$Mean_2$ = Second 25 per cent of sample according to cum. GPA.

$Mean_3$ = Third 25 per cent of sample according to cum. GPA.

$Mean_4$ = Lower 25 per cent of sample according to cum. GPA.

Note: Within each value there was no significant difference between the quartile scores.

TABLE IV

Study Of Values Post-Test Mean Scores By Quartiles

	$Mean_1$	$Mean_2$	$Mean_3$	$Mean_4$
Theoretical	47.43	43.07	44.00	41.54
Economic	43.86	46.36	43.62	40.77
Aesthetic	36.36	39.43	41.00	39.92
Social	37.93	37.29	36.23	41.69
Political	43.71	42.29	40.77	39.62
Religious	30.71	31.57	34.38	36.46

$Mean_1$ = Upper 25 per cent of sample according to cum. GPA.

$Mean_2$ = Second 25 per cent of sample according to cum. GPA.

$Mean_3$ = Third 25 per cent of sample according to cum. GPA.

$Mean_4$ = Lower 25 per cent of sample according to cum. GPA.

Note: Within each value there was no significant difference between the quartile scores.

DISCUSSION

Hutton,[30] Dworkin,[27] and Rosenberg[10] have reported the existence of significant changes in certain attitudes of dental students during dental school and have raised the suggestion that these changes may be a function of the dental school environment. Other authors, including Crowder[23] and Fogels, Janke, and Shiere,[29] have found no significant changes in the attitudes of dental students during their dental school experience. This lack of agreement may be due to several factors, since the studies differed both in design and composition and used varying instruments for measurement.

Certainly more credance must be given to the findings of longitudinal studies such as those conducted by Rosenberg[10] and Fogels, Janke, and Shiere,[29] than to the cross-sectional studies of Crowder,[23] Dworkin,[27] and Hutton.[30] Even so, the results are so varied that no definite conclusions can be reached from the results of these investigations.

In recognition of the advantages of a longitudinal study, the present investigation was designed so that the same students were tested initially and again after a period of eight months. During this time interval, the environment of the students was varied due to the shift from the pre-clinical to the clinical phase of the dental school curriculum.

The data gathered by means of the Study of Values indicated that no significant changes occurred from pre-test to post-test in any of the six areas measured by this instrument. When the 12 variables (six values times two measurements) were subjected to a t-test of

paired variables, both by class and by class quarters, no significant differences were shown. Furthermore, when an analysis of variance was made for each of the 12 variables compared to each class quarter, no significant differences were observed. From these findings, it appears that at Indiana University School of Dentistry, the sample group of third-year dental students did not demonstrate any personality changes during a period of environmental change caused by moving from the pre-clinical phase of their education to the clinical phase.

When a cross-sectional comparison of the initial profile of first-year students with the pre-test and post-test of third-year students was made, a significant difference was observed in one area, religious values, from initial profile to pre-test. This finding is a limited value, however, because of the cross-sectional comparison. At a confidence level of .05, this may be the one possibility in 20 of a chance occurrence.

Hutton,[30] Flesch,[31] and Manhold, Shatin and Manhold[32] used the Study of Values with dental students and reported the rank-order of the six values. In each case, dental students scored highest in the area of theoretical values and higher in economic than social values. In the present study, the theoretical value had the highest mean score in the first, second and fourth quartiles of the sample and in the sample as a whole. The second quartile scored highest in the area of economic values. The entire sample and each quartile had the lowest mean scores on religious values.

Results of the present study seem to agree with those of previous investigations using the Study of Values. The sample of third-year dental students placed greatest importance on theoretical and economic values and least importance on social and religious values.

Interpretations of the data from this study are subject to the following limitations:

1. Sample size and scope. The class consisted of 106 members. Usable tests could not be obtained from the entire class. Furthermore, a longitudinal comparison of pre-test and post-test scores was possible for only 54 members of the class. While the study ideally would have included all male members of the class, the author believes that the results reflect a representative sample of the third-year class of dental students at Indiana University. A quartile division of the class according to a determination of each member's class rank by means of cumulative grade point average corresponded almost exactly to a quartile division of the sample. Apparently, the members of the class who did not participate in the study were almost equally divided among the four quarters of the class. In addition, this investigation dealt only with dental students at Indiana University.

2. Study design. Although the study was longitudinal in design, the time interval from pre-test to post-test was only eight months. Perhaps if the time interval had been longer, differences might have been demonstrated. The author felt initially that if changes occurred during the third year, as suggested by Hutton[30] and More,[14] the change in environment might be a factor. For this reason, the pre-test was given to students immediately before they entered the clinical phase of dental school and the post-test was given after a summer session and fall semester of clinical exposure. The time interval was governed by several factors, including; (1) the time limitations of the author's graduate program, (2) the availability of a class which was making the transition from the pre-clinical phase to the clinical phase of their education, and (3) the desirability of including a grading period so that the class could be accurately divided into quarters.

3. Relative data. The Study of Values is an ipsative measurement. Each value is interrelated with the other five so that a high score in one area can be obtained only by lowering one or more of the other five values. The scores obtained with the Study of

> Values do not reflect an absolute measurement of each value. The individual scores are relative to the other five. This limitation is acknowledged by the author. The Study of Values was selected because of its face validity, high reliability, ease of administration and scoring, and the measurement of desired values.

From the preceding discussion, one might be tempted to assume that because no significant value changes could be demonstrated, neither the change in environment nor the environment of the dental school itself was a factor relative to the values of the dental student. Two possible explanations exist: (1) the Study of Values was unable to measure changes in values or attitudes accurately or, (2) values simply did not change despite the dissatisfactions and frustrations voiced by the dental students.

Regarding particulars in the questionnaire, several of the five-point response items were highly suggestive of unhappiness with various aspects of the dental school, particularly the clinical phase. Fewer than 20 per cent of the respondents felt that the quality of instruction in dental school was better than in their pre-dental college experience. Furthermore, less than a quarter felt that their clinical curriculum was better taught than their basic science courses. The author believes that this finding may reflect less application of sound educational methodology among the clinical educators than basic science educators.

The questionnaire was purposely constructed without requesting an opinion as to the effectiveness of part-time educators versus full-time educators in order to avoid a discussion of individual personalities. However, it was reported that part-time instructors were considered more pragmatic while the full-time instructors were more theoretical.

Unfortunately, fewer than 10 per cent of the students in the sample felt that their dental school experience had prompted them to consider a career in dental education. It is the opinion of the author that although the majority of students attend dental school solely with the objective of practicing dentistry, school administrators should make an attempt to identify early and encourage those individuals demonstrating an interest in research and education.

Earlier it was suggested that perhaps the dental student begins dental school with greater economic motivation than social motivation. This possibility seems to have some support from the questionnaire responses. More than 70 per cent of the students expressed concern over the threat to private practice if a government-sponsored dental care program should come into being. When asked about motives for improving practice efficiency, only four students in 10 gave the opportunity to treat more patients as the reason rather than economic benefits for themselves.

The current curriculum emphasizing traditional lecture courses found favor among less than half the respondents. This suggests that more informal seminar-type learning or independent study might find favor among many students.

It seems that the students are aware of some of the basic tenets of educational methods and, quite understandably, expect their dental educators to subscribe to these principles. More than 90 per cent of the students sampled indicated a desire to have instructors state the course objectives and the criteria by which they will be evaluated. Of the total, 85 per cent felt that the measurement of learned material should be the primary basis for grades rather than class attendance or participation.

Current methods of examining students were another area of concern to the students. Fewer than 20 per cent of the students felt that they could best prepare for their examinations by reviewing their notes and the text. Seventy per cent felt that this preparation was best accomplished by reviewing previous examinations on file in the library. In addition, fewer than 10 per cent said that their examinations were an accurate reflection of the material learned during the course. When one relates these data to the belief among educators that the fairness of course examinations is a major attitudinal determinant toward that course, the abundance of frustration among the dental students becomes less of a mystery.

Four open-ended response items were included in the questionnaire with the objective of learning from the student which factors within the dental school, in his opinion, had influenced his attitudes.

Responses to the items requesting dental school factors that changed the students' attitudes toward dental school and dentistry suggested a great need for earlier clinical experience and deletion

of repetitive course material. In addition, it was generally felt that the faculty needed to be upgraded. They also cited a need to improve inter- and intra-departmental cooperation, coordination and communication.

Among the factors which the students said most affected their attitudes toward dentistry, contact with the faculty had almost twice as many negative responses as positive responses. The factor which had the greatest number of positive responses was patient contact.

Regarding influences on their attitudes, the dental students most often mentioned that dental school was not what they had expected. Many of them cited the lack of understanding for the student and their feeling that dental school was not a realistic preparation for private practice as additional reasons.

At this point a sampling of the answers to the open-ended questions is presented to indicate the tone of those responses.

> My reasons for wanting to become a dentist are different now than when I was a freshman dental student. Please explain:
>
> - Too late to change! Too much time and money have been spent to change now.
> - I just want to make a good living for myself and my family and take a lot of vacations.
> - Income is more of a motivating force than before.
> - There has been little change because I knew what to expect whether I liked it or not.
> - It was mostly monetary then, now I have developed a need to want to help people.

If you were the Dean, what changes in the dental school would you work hardest to bring about?

- Pass-fail system...less emphasis on grades and more importance on learned material...shorter lecture periods...more concentrated material in shorter length of time.

- Standardize the system so students know what to expect. The teaching and ability of instructors should be evaluated as well as students. Lectures should be a learning experience as well as exams ...most are not. Make the courses relevant and worthwhile.

- More preparation by various departments in presenting lecture course. Closer cooperation between departments in correlating lecture material and clinical programs.

- I would have more clinical time for freshmen and would correlate the basic sciences with clinical application in a more organized form. I would also eliminate as much lab work as possible and concentrate on clinical and diagnostic skills.

- Change the examination procedure to try to be fairer to those putting in an effort to study and not use old exams. Try to coordinate all departments to work under 'total patient care' concept. Try to eliminate the few unnecessary courses or at least, perhaps, condense a few courses into eight week periods.

What factors during the last two years, if any, have had the greatest impact on your attitudes toward dentistry?

- Testing system where emphasized or important material is not tested in favor of trivia and the actions of some clinical instructors who are more critical than helpful.

- The small unimportant courses that should be combined and the inability to do anything about it. The 'take it or leave it' attitude.

- The general attitude of and treatment by instructors. It has been like a big 'pledgeship'...harassment and busy-work. It's hard to maintain interest under these conditions.

Why have these factors changed your attitudes?

- I have assumed a defensive posture in regards to patients, staff, and dental education. Only three more semesters until I'm out of this Black Hole of Calcutta.

- I don't like having something forced at me in a 'learn it or else' form.

- I think that one can only be as interested in his course work as the instructor is. If the instructor feels it is important, then this will be transferred to the students.

- If you can't get excited over something...it becomes something far less than enjoyable to do.

- I don't know what to expect or what needs to be achieved in clinical work.

The question may be raised whether the apparent unhappiness among dental students is different from the situation at other professional schools. On the basis of his experiences and observations, the author thinks not. Perhaps it is sort of a "pledgeship" with dental school representing the "Hell Week" phase necessary for admittance to the "fraternity" of the dental profession.

The questionnaire revealed that dental students have varying motives for attending dental school. Some are primarily economically oriented, some are socially oriented, and some are oriented toward research and education. Various aspects of the dental school environment are unappealing to each at different times. The dental student, whatever his objectives, respects effective educational methods and fair methods of evaluation. Although the findings suggest that the values of the dental student are not likely to change, he does appear

to respond to conflicts in the dental school environment by becoming increasingly frustrated and often hostile. Needless to say, this serves as a serious barrier to learning.

A dental school administrator or educator would find it difficult to justify the provision of a teaching-learning environment which was acceptable to every student. However, it does seem that many aspects of the dental school environment cause frustrations which might be lessened through a closer adherence to such basic principles of education as the following:

1. Listing course objectives so that the student will know what he can expect from the instructor and what the instructor expects of him.
2. Testing according to the listed course objectives and stating the criteria for evaluation and grading.
3. Revising the curriculum to permit earlier clinical exposure and eliminating repetitive course content.
4. Gearing instruction to the learning rate and ability of the individual student.
5. Providing more informal learning situations, such as small seminars.

SUMMARY AND CONCLUSIONS

The purpose of this thesis was to investigate the influence of the dental school environment upon certain attitudes of dental students.

An initial attitudinal profile of beginning first-year dental students was established by means of the Allport-Vernon-Lindzey Study of Values. Using the same instrument, pre-test and post-test profiles were established for dental students at the beginning of the third year and after eight months of clinical exposure.

A cross-sectional comparison was made of the initial profile of the first-year students with the pre-test and post-test profiles of the third-year students. A significant difference, at the .05 level of confidence, was observed in a comparison of the religious values of the first-year students with the pre-test of the third-year students. No significant differences were observed in the other five values. In addition, no significant differences in any values were observed when the first-year students were compared to the post-test of the third-year students.

A longitudinal comparison of the pre-test and post-test profiles was made. No significant differences were demonstrated for the entire sample and for each quartile in any of the six areas with which the Study of Values is concerned.

Additional information was gathered from the third-year students by using a questionnaire. The questionnaire revealed dissatisfaction and frustration with various aspects of the dental school environment.

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It seems likely that some of this frustration could be reduced by an educational approach which would provide clearly stated course objectives and criteria for evaluation, earlier clinical exposure, elimination of repetitive course content, more individualized instruction, and more informality in the teaching-learning environment.

Within the defined limitations of this study, it appears that the sample of third-year dental students at Indiana University School of Dentistry did not demonstrate measurable changes in values despite an indication of dissatisfaction and frustration with dental school environment.

Since the results of this study are suggestive rather than definitive, it would seem appropriate to investigate further the topic of attitude change among dental students. A study of this nature should involve a larger sample of dental students representing a number of dental schools and perhaps covering a longer period of their educational program in dentistry. In addition, more frequent employment of different measurement devices is recommended.

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ABSTRACT

ENVIRONMENTAL EFFECTS ON DENTAL STUDENT ATTITUDES

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The purpose of this thesis was to investigate the influence of the dental school environment upon certain attitudes of dental students.

An initial attitudinal profile of beginning first-year dental students was established by means of the Allport-Vernon-Lindzey Study of Values. Using the same instrument, pre-test and post-test profiles were established for dental students at the beginning of the third year and after eight months of clinical exposure.

A cross-sectional comparison was made of the initial profile of the first-year students with the pre-test and post-test profiles of the third-year students. A significant difference, at the .05 level of confidence, was observed in a comparison of the religious values of the first-year students with the pre-test of the third-year students. No significant differences were observed in the other five values. In addition, no significant differences in any values were observed when the first-year students were compared to the post-test of the third-year students.

A longitudinal comparison of the pre-test and post-test profiles were made. No significant differences were demonstrated for the entire sample and for each quartile in any of the six areas with which the Study of Values is concerned.

Additional information was gathered for the third-year students by using a questionnaire. The questionnaire revealed dissatisfaction and frustration with various aspects of the dental school environment.

Within the defined limitations of this study, it appears that the sample of third-year dental students at Indiana University School of Dentistry did not demonstrate measurable changes in values despite an indication of dissatisfaction and frustration with the dental school environment.

From the answers to the questionnaire, it seems likely that some of this frustration could be reduced by an educational approach which would provide clearly stated course objectives and criteria for evaluation, earlier clinical exposure, elimination of repetitive course content, more individualized instruction, and more informality in the teaching-learning environment.

APPENDIX A

Statistical Results From The Study Of Values

TABLE I

Study of Values

Initial Profile - First Year Dental Students (N=104)

	Mean	S.D.*
Theoretical	44.18	±7.65
Economic	41.80	±7.47
Aesthetic	37.64	±7.59
Social	38.24	±7.65
Political	41.64	±6.49
Religious	36.06	±8.37

*Standard Deviation computed by Lathrop's method.

TABLE II

Paired Variables Of Entire Sample

Pair	Variable	N	Mean	Std. Dev.	DF	T For Paired Data
1	1	54	44.833333	5.8430736	53	1.0914596
	7		44.055555	7.0881689		
2	2	54	44.055555	7.8076321	53	0.40293599
	8		43.703703	8.3882884		
3	3	54	40.074074	7.9949320	53	1.1427632
	9		39.129630	8.0494844		
4	4	54	36.611111	6.8001572	53	1.9803632
	10		38.259259	7.9079258		
5	5	54	42.703703	5.6322174	53	1.6174977
	11		41.648148	5.8185046		
6	6	54	31.759259	9.6366736	53	2.1537241
	12		33.203703	10.434666		

Pre-Test	Post-Test	
1	7	= Theoretical
2	8	= Economic
3	9	= Aesthetic
4	10	= Social
5	11	= Political
6	12	= Religious

TABLE III

Paired Variables Of First Quartile

Pair	Variable	N	Mean	Std. Dev.	DF	T For Paired Data
1	1	14	47.642857	4.6011226	13	0.16736359
	7		47.428571	5.3452249		
2	2	14	43.857142	7.0586242	13	0.00000000E-38
	8		43.857142	6.6547512		
3	3	14	39.500000	5.9839529	13	1.6191564
	9		36.357142	6.5351963		
4	4	14	36.714285	5.1054808	13	0.81264839
	10		37.928571	5.4556151		
5	5	14	42.642857	6.0714609	13	1.0197130
	11		43.714285	5.3122293		
6	6	14	29.642857	9.9815764	13	0.67768410
	12		30.714286	10.978500		

Pre-Test	Post-Test	
1	7	= Theoretical
2	8	= Economic
3	9	= Aesthetic
4	10	= Social
5	11	= Political
6	12	= Religious

TABLE IV

Paired Variables Of Second Quartile

Pair	Variable	N	Mean	Std. Dev.	DF	T For Paired Data
1	1	14	44.071428	6.4980978	13	0.65671883
	7		43.071428	7.3428593		
2	2	14	46.571428	8.7505102	13	0.14411969
	8		46.357142	8.9923655		
3	3	14	38.642857	6.1219296	13	0.79818532
	9		39.428571	4.6029136		
4	4	14	35.428571	8.4645349	13	1.1736395
	10		37.285714	7.1943201		
5	5	14	43.857142	5.9336996	13	1.1089935
	11		42.285714	5.6490785		
6	6	14	31.142857	9.9835029	13	0.34103109
	12		31.571429	12.004578		

Pre-Test	Post-Test	
1	7	= Theoretical
2	8	= Economic
3	9	= Aesthetic
4	10	= Social
5	11	= Political
6	12	= Religious

TABLE V

Paired Variables Of Third Quartile

Pair	Variable	N	Mean	Std. Dev.	DF	T For Paired Data
1	1	13	44.615385	4.3308671	12	0.41740706
	7		44.000000	5.9019771		
2	2	13	44.384615	9.1700460	12	0.56195119
	8		43.615385	9.3856136		
3	3	13	42.307692	11.055802	12	1.1527077
	9		41.000000	11.754432		
4	4	13	34.692307	7.2270858	12	0.89863072
	10		36.230769	9.5756100		
5	5	13	41.923077	6.0478858	12	0.95929430
	11		40.769230	6.6100157		
6	6	13	32.076923	9.6303473	12	1.7201464
	12		34.384615	9.3053609		

Pre-Test	Post-Test	
1	7	= Theoretical
2	8	= Economic
3	9	= Aesthetic
4	10	= Social
5	11	= Political
6	12	= Religious

TABLE VI

Paired Variables Of Fourth Quartile

Pair	Variable	N	Mean	Std. Dev.	DF	T For Paired Data
1	1	13	42.846154	7.0100660	12	0.83266015
	7		41.538461	8.7427626		
2	2	13	41,230769	5.6591202	12	0.20493632
	8		40.769230	8.3382037		
3	3	13	40.000000	8.5146931	12	0.34603106E-01
	9		39.923077	8.0773504		
4	4	13	39.692307	5.4982514	12	0.97382148
	10		41.692307	8.8165054		
5	5	13	42.307692	4.8025100	12	1.8659479
	11		39.615385	5.4701990		
6	6	13	34.384615	9.3944882	12	1.6997166
	12		36.461538	9.1798273		

Pre-Test	Post-Test	
1	7	= Theoretical
2	8	= Economic
3	9	= Aesthetic
4	10	= Social
5	11	= Political
6	12	= Religious

TABLE VII

Attitude Change - Junior Dental Students By Quarters

Variable Number 1 = Theoretical Pre-Test

Quarter	Mean	Variance	S.D.	Sample Size
1	47.642857	21.170330	4.6011226	14
2	44.071428	42.225275	6.4980978	14
3	44.615385	18.756410	4.3308671	13
4	42.846154	49.141026	7.0100660	13

Homogeneity of variance has been tested with Bartlett's Chi-Square. A corrected Chi-Square of 4.0937 with 3 DF has been computed. (PROB = 0.25151785)

Analysis of Variance

Source Of Variation	DF	Sums Of Squares	Mean Square	F
Among Groups	3	170.5869	56.8623	1.7348 N.S. (PROB = 0.17182942)
Within Groups	50	1638.9131	32.7783	
Total	53	1809.5000		

TABLE VIII

Attitude Change - Junior Dental Students By Quarters

Variable Number 2 = Economic Pre-Test

Quarter	Mean	Variance	S.D.	Sample Size
1	43.857142	49.824175	7.0586242	14
2	46.571428	76.571428	8.7505101	14
3	44.384615	84.089743	9.1700460	13
4	41.230769	32.025641	5.6591201	13

Homogeneity of variance has been tested with Bartlett's Chi-Square. A corrected Chi-Square of 3.2261 with 3 DF has been computed. (PROB = 0.35805442)

Analysis of Variance

Source Of Variation	DF	Sums Of Squares	Mean Square	F
Among Groups	3	194.3047	64.7682	1.0665 N.S. (PROB = 0.37173875)
Within Groups	50	3036.5293	60.7306	
Total	53	3230.8340		

TABLE IX

Attitude Change - Junior Dental Students By Quarters

Variable Number 3 = Aesthetic Pre-Test

Quarter	Mean	Variance	S.D.	Sample Size
1	39.500000	35.807692	5.9839529	14
2	38.642857	37.478022	6.1219296	14
3	42.307692	122.23077	11.055802	13
4	40.000000	72.500000	8.5146931	13

Homogeneity of variance has been tested with Bartlett's Chi-Square. A corrected Chi-Square of 6.4102 with 3 DF has been computed. (PROB = 0.09327173) Therefore, the Welch Test will be used.

The Test Statistic, F', = 0.3662
With Numerator DF = 3. and Approximate Denominator DF = 27.0
The Probability of Chance Occurrence is 0.7779.

TABLE X

Attitude Change - Junior Dental Students By Quarters

Variable Number 4 = Social Pre-Test

Quarter	Mean	Variance	S.D.	Sample Size
1	36.714285	26.065934	5.1054807	14
2	35.428571	71.648351	8.4645349	14
3	34.692307	52.230769	7.2270858	13
4	39.692307	30.230769	5.4982514	13

Homogeneity of variance has been tested with Bartlett's Chi-Square. A corrected Chi-Square of 4.1179 with 3 DF has been computed. (PROB = 0.24901220)

Analysis of Variance

Source Of Variation	DF	Sums Of Squares	Mean Square	F
Among Groups	3	191.0088	63.6696	1.4087 N.S. (PROB = 0.25117765)
Within Groups	50	2259.8252	45.1965	
Total	53	2450.8340		

TABLE XI

Attitude Change - Junior Dental Students By Quarters

Variable Number 5 = Political Pre-Test

Quarter	Mean	Variance	S.D.	Sample Size
1	42.642857	36.862637	6.0714608	14
2	43.857142	35.208791	5.9336996	14
3	41.923077	36.576923	6.0478858	13
4	42.307692	23.064102	4.8025100	13

Homogeneity of variance has been tested with Bartlett's Chi-Square. A corrected Chi-Square of 0.9341 with 3 DF has been computed. (PROB = 0.84129033)

Analysis of Variance

Source Of Variation	DF	Sums Of Squares	Mean Square	F
Among Groups	3	28.6377	9.5459	0.2888 N.S. (PROB = 0.83325865)
Within Groups	50	1652.6221	33.0524	
Total	53	1681.2598		

TABLE XII

Attitude Change - Junior Dental Students By Quarters
Variable Number 6 = Religious Pre-Test

Quarter	Mean	Variance	S.D.	Sample Size
1	29.642857	99.631867	9.9815763	14
2	31.142857	99.670329	9.9835029	14
3	32.076923	92.743589	9.6303473	13
4	34.384615	88.256410	9.3944882	13

Homogeneity of variance has been tested with Bartlett's Chi-Square. A corrected Chi-Square of 0.0631 with 3 DF has been computed. (PROB = 0.99586564)

Analysis of Variance

Source Of Variation	DF	Sums Of Squares	Mean Square	F
Among Groups	3	158.9414	52.9805	0.5562 N.S. (PROB = 0.64641840)
Within Groups	50	4762.9292	95.2586	
Total	53	4921.8706		

TABLE XIII

Attitude Change - Junior Dental Students By Quarters

Variable Number 7 = Theoretical Post-Test

Quarter	Mean	Variance	S.D.	Sample Size
1	47.428571	28.571429	5.3452248	14
2	43.071428	53.917582	7.3428593	14
3	44.000000	34.833333	5.9019771	13
4	41.538461	76.435897	8.7427626	13

Homogeneity of variance has been tested with Bartlett's Chi-Square. A corrected Chi-Square of 3.5372 with 3 DF has been computed. (PROB = 0.31596702)

Analysis of Variance

Source Of Variation	DF	Sums Of Squares	Mean Square	F
Among Groups	3	255.2451	85.0817	1.7669 N.S. (PROB = 0.16547931)
Within Groups	50	2407.5889	48.1518	
Total	53	2662.8340		

TABLE XIV

Attitude Change - Junior Dental Students By Quarters

Variable Number 8 = Economic Post-Test

Quarter	Mean	Variance	S.D.	Sample Size
1	43.857142	44.285714	6.6547512	14
2	46.357142	80.862637	8.9923655	14
3	43.615385	88.089743	9.3856136	13
4	40.769230	69.525640	8.3382037	13

Homogeneity of variance has been tested with Bartlett's Chi-Square. A corrected Chi-Square of 1.6070 with 3 DF has been computed. (PROB = 0.65779576)

Analysis of Variance

Source Of Variation	DF	Sums Of Squares	Mean Square	F
Among Groups	3	210.9453	70.3151	0.9993 N.S. (PROB = 0.40095009)
Within Groups	50	3518.3145	70.3663	
Total	53	3729.2598		

TABLE XV

Attitude Change - Junior Dental Students By Quarters

Variable Number 9 = Aesthetic Post-Test

Quarter	Mean	Variance	S.D.	Sample Size
1	36.357142	42.708791	6.5351963	14
2	39.428571	21.186813	4.6029135	14
3	41.000000	138.16667	11.754432	13
4	39.923077	65.243589	8.0773504	13

Homogeneity of variance has been tested with Bartlett's Chi-Square. A corrected Chi-Square of 10.9057 with 3 DF has been computed. (PROB = 0.01224713) Therefore, the Welch Test will be used.

The Test Statistic, F', = 0.0268
With Numerator DF = 3. and Approximate Denominator DF = 26.0
The Probability of Chance Occurrence is 0.4418.

TABLE XVI

Attitude Change - Junior Dental Students By Quarters

Variable Number 10 = Social Post-Test

Quarter	Mean	Variance	S.D.	Sample Size
1	37.928571	29.763736	5.4556151	14
2	37.285714	51.758242	7.1943201	14
3	36.230769	91.692307	9.5756100	13
4	41.692307	77.730769	8.8165054	13

Homogeneity of variance has been tested with Bartlett's Chi-Square. A corrected Chi-Square of 4.2219 with 3 DF has been computed. (PROB = 0.23848270)

Analysis of Variance

Source Of Variation	DF	Sums Of Squares	Mean Square	F
Among Groups	3	221.5068	73.8356	1.1936 N.S. (PROB = 0.32172063)
Within Groups	50	3092.8643	61.8573	
Total	53	3314.3711		

TABLE XVII

Attitude Change - Junior Dental Students By Quarters

Variable Number 11 = Political Post-Test

Quarter	Mean	Variance	S.D.	Sample Size
1	43.714285	28.219780	5.3122293	14
2	42.285714	31.912088	5.6490785	14
3	40.769230	43.692307	6.6100157	13
4	39.615385	29.923077	5.4701989	13

Homogeneity of variance has been tested with Bartlett's Chi-Square. A corrected Chi-Square of 0.7085 with 3 DF has been computed. (PROB = 0.87121335)

Analysis of Variance

Source Of Variation	DF	Sums Of Squares	Mean Square	F
Among Groups	3	129.2158	43.0719	1.2934 N.S. (PROB = 0.28695251)
Within Groups	50	1665.0996	33.3020	
Total	53	1794.3154		

TABLE XVIII

Attitude Change - Junior Dental Students By Quarters

Variable Number 12 = Religious Post-Test

Quarter	Mean	Variance	S.D.	Sample Size
1	30.714286	120.52747	10.978500	14
2	31.571429	144.10989	12.004578	14
3	34.384615	86.589743	9.3053609	13
4	36.461538	84.269230	9.1798273	13

Homogeneity of variance has been tested with Bartlett's Chi-Square. A corrected Chi-Square of 1.2427 with 3 DF has been computed. (PROB = 0.74279184)

Analysis of Variance

Source Of Variation	DF	Sums Of Squares	Mean Square	F
Among Groups	3	280.1650	93.3883	0.8504 N.S. (PROB = 0.47295818)
Within Groups	50	5490.5942	109.8119	
Total	53	5770.7593		

APPENDIX B

Summary Of The Responses To The Student Questionnaire

Questionnaire and Responses

The following areas seem to be a source of concern to dental students in their third and fourth years of dental school. Could we please have your frank and honest responses to these questions? Your responses will be used for a thesis study. Names need not be given.

Please answer the following questions according to this scale:

A. Strongly Disagree
B. Disagree
C. Not Decided
D. Agree
E. Strongly Agree

1. The quality of teaching in dental school is superior to my pre-dental college teaching.

   A. 21.92 B. 54.79 C. 4.11 D. 19.18 E. 0.00

2. Generally speaking, clinical subjects are better taught than basic science subjects.

   A. 20.55 B. 45.21 C. 10.96 D. 20.55 E. 2.74

3. For the most part, part-time instructors emphasize the practical rather than the idealistic approach toward dentistry.

   A. 1.37 B. 4.11 C. 15.07 D. 68.49 E. 9.59

4. For the most part, full-time instructors emphasize the practical rather than the idealistic approach toward dentistry.

   A. 23.29 B. 50.68 C. 16.44 D. 8.22 E. 1.37

5. Thus far, dental school experiences have interested me in pursuing a career in dental education rather than private practice.

   A. 54.79 B. 28.77 C. 6.85 D. 2.74 E. 6.85

6. I have learned more useful information about dentistry from informal contacts with faculty members than in my courses.

   A. 2.74 B. 38.36 C. 15.07 D. 32.88 E. 10.96

7. Dental school is preparing me better for a dental career serving middle class patients than the lower socio-economic groups.

   A. 4.11 B. 23.29 C. 17.81 D. 43.84 E. 9.59

8. If I were to employ various techniques to increase my efficiency, my primary reason would be to provide a better standard of living for my family rather than to treat more patients.

   A. 1.37 B. 41.10 C. 15.07 D. 36.99 E. 4.11

9. If a government sponsored dental care program existed, I would be concerned about the threat to the present private practice system of dental care delivery.

   A. 6.85 B. 8.22 C. 13.70 D. 32.88 E. 38.36

10. Generally speaking, the "requirement system" is a better teaching method for dental school experience than is "total patient care."

    A. 28.77 B. 34.25 C. 19.18 D. 8.22 E. 9.59

11. Examinations in dental school accurately reflect the amount of material which the student has learned during the course.

A. 49.32 B. 38.36 C. 2.74 D. 8.22 E. 1.37

12. Preparation for exams in dental school is better accomplished by reviewing class notes and the text rather than by looking at old exams on file in the library.

A. 34.25 B. 36.99 C. 10.96 D. 12.33 E. 5.48

13. Lecturers at the dental school should tell the class what material will be covered during the course and for what material we must be responsible upon an exam.

A. 2.74 B. 1.37 C. 2.74 D. 45.21 E. 47.95

14. I prefer the present system of grading rather than a Pass-Fail or similar system.

A. 24.66 B. 36.99 C. 12.33 D. 19.18 E. 6.85

15. Grades should be based more on a measurement of learned material rather than on attendance or class participation.

A. 1.37 B. 4.11 C. 9.59 D. 53.42 E. 31.51

16. Dental school has sufficiently prepared me to deal with the dental needs of all socio-economic levels in the U.S.

A. 20.55 B. 36.99 C. 20.55 D. 21.92 E. 0.00

17. My reasons for wanting to become a dentist are different now than when I was a freshman dental student.

A. 2.74 B. 43.84 C. 10.96 D. 35.62 E. 6.85

Data in the next section are based on categorization and frequency-of-mention of responses to the four open-ended questionnaire items.

A. My reasons for wanting to become a dentist are different now than when I was a freshman dental student. Please explain your answer.

1. More because of economic motives. (15)
2. Anxious to finish because of increased frustrations. (9)
3. More for service to society motives. (7)
4. More motivated toward research and teaching. (2)
5. Reasons have not changed. (5)

B. If you were the Dean, what changes in the dental school would you work hardest to bring about?

1. Revision of the curriculum to reduce repetition and provide earlier clinical experience. (29)
2. Upgrade the quality of the faculty. (20)
3. Improvement of cooperation and coordination between departments. (16)
4. Change the grading system. (12)
5. Abolish class attendance requirements. (10)
6. Improve the quality of examinations. (8)
7. Upgrade the quality of lectures. (7)
8. Reduction in the amount of laboratory work. (6)

C. What factors during the last two years, if any, have had an impact on your attitudes toward dentistry?

	Positive Responses	Negative Responses
1. Contact with faculty	(9)	(16)
2. Quality of instruction	(1)	(14)
3. Contact with patients	(8)	(2)
4. Quality of examinations	(0)	(8)
5. Third-party payment programs	(1)	(5)
6. Laboratory work	(0)	(5)

D. Why have these factors changed your attitudes? Please explain.

1. Not what expected in dental school. (11)
2. Lack of understanding for the student. (8)
3. Did not know what was expected of me. (8)
4. Lack of application to private practice. (7)
5. Decreased interest in school. (5)
6. The dental needs of the public. (2)